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BASEMENT WALL WATER PROTECTION SYSTEM

TECHNICAL FIELD

The field of this invention relate to a system for maintaining a dry condition for basement walls.

BACKGROUND OF THE DISCLOSURE

Basements are often built into a building because foundations need to be built anyway. It is a relatively easy step to empty the interior of the foundation walls and provide a cement floor for a basement that provides for storage and often extra useful rooms in both commercial and residential buildings. Extra useful rooms such as a utility or laundry room, and or living quarters such as a den or extra bedroom may be placed in a basement. However, the basement walls are most commonly made from concrete or cement block and are inherently porous to water which may allow leakage and provide for water seepage. While most basement walls and floor are built above ground water levels, rain water and water runoff may be at heights up to ground level. If this water leaks and seeps into the basement walls, the basement may become undesirable. Even if the water leakage is not visible, the walls may provide excess humidity to the basement which often gives the basement the undesirable dank and musty feeling to any occupant. Certain humid conditions may also allow mold to grow on the interior walls which may pose a health risk.

There are three different methods which are commonly employed either separately or in conjunction with each other to attempt to keep a basement dry from outside rain and runoff water. The first method is to seal the exterior of the basement walls. The exterior is made waterproof on the outside with a tar or other hydrophobic and impermeable sheet coating. In this way, water cannot enter the wall. It is most efficient to waterproof the walls during initial construction. As the building ages, the integrity of the water proof layer may degrade to eventually allow leakage through a developed crack or hole. Once the water is past the water proof layer, the water is then free to diffuse through the concrete and or cement block to cause water, seepage and/or humidity problems. Repair to the

waterproof layer can be expensive due to the fact that the exact location of the crack or hole is usually not known. Thus, the entire area is usually dug out and resealed. Due to the expense, many people will thus needlessly tolerate leakage to a certain extent before paying for such repairs.

A second method involves the ability to drain away water and prevent hydrostatic pressure from building up about the exterior of the building. Hydrostatic pressure can push more water into the crack or hole and through any porous section of the wall. Often the drainage is in the form of subterranean piping surrounded by gravel positioned at the base of the cement wall that leads to remote location such a storm sewer system, dry well or nearby lake or stream. Again, drainage systems are most efficiently installed during initial construction. As the building ages, the integrity of the drainage system may degrade due to obstructions such as dirt and roots which restrict the removal of the water. The drainage pipe may also collapse from ground pressure or by growth of nearby roots. If the restriction is severe enough, the hydrostatic pressure can build up about the exterior of the basement walls. In order to repair the drainage system, it is often necessary to dig out the entire area to lay new piping under the bottom of the basement wall which results in great expense. Thus, many people will thus needlessly tolerate leakage to a certain extent before paying for such repairs.

A third method is to prevent water from approaching the basement wall area in the first place. Often the ground is sloped away from the building to allow initial rain water to run down away from the building. Gutters are often installed to capture the roof water and direct it away from the building. Other systems such as second vertical walls have been proposed to provide empty space between the exterior of the basement wall and the second wall to maintain the basement wall in a permanently dry condition. Again, these secondary walls are best installed during initial construction because retrofitting them in place is an expensive proposition.

What is needed is an improved system for directing water away from a basement wall that is inexpensive to install and can be retrofitted to existing buildings without great expense.

What is also needed is a basement wall ground water protection

system that takes into account soil movement during freeze and thaw cycles to maintain its integrity in the ground.

SUMMARY OF THE DISCLOSURE

In accordance with one aspect of the invention, a basement wall water protection system has at least one water impermeable flexible member having a short leg section that is abuttable against an upper portion of basement wall preferably below ground level and a long leg section extending substantially away from the basement wall a distance at least as great as the tangent of 15° times the height of the basement wall below the impermeable flexible member.

Preferably, the impermeable flexible member has a first side edge and a second complementary side edge such that a first side edge of one impermeable member can snap fit into a second side edge of a second impermeable member to form a watertight joint or junction. The impermeable water flexible member is preferably made from a polyethylene plastic material.

In accordance with another aspect of the invention, a basement wall water protection system includes a plurality of semi-flexible water impermeable overlapping plate members with each plate member having a short leg section that is abuttable against an upper portion of the basement wall below ground level and a long leg section extending substantially away from the basement wall a distance sufficient to keep water away as water seeps downward through the ground toward the basement wall at an angle. Each of the impermeable flexible members has a first side edge and a second complementary side edge such that a first side edge of one impermeable member can fit with the second side edge of a second impermeable member to form a watertight joint.

At least one water impermeable flexible member has a short leg section that is abuttable against an upper portion of basement wall below ground level and a long leg section extending substantially away from said basement wall a distance at least as great as the tangent of 15° times the height of the basement wall below the impermeable flexible member. Preferably, the short leg is free to move against said basement wall and held against said wall solely by ground pressure. Preferably, each of the flexible water impermeable members is made from polyethylene. It is

desirable that each of the water impermeable members is positioned about 16 inches below ground level with the short leg member abuttable against said basement wall. It is preferable that the water impermeable members are stackable for ease of storage and transportation thereof.

It is also desirable that corner members are positioned at a respective corner of two basement walls and overlapping respective water impermeable members abutting the respective basement walls. It is also desirable that the long leg extends away from the basement wall at approximately a 5° downward slope away from the basement wall and extends at least approximately the height of the basement wall below the leg times the tangent of 15°.

In accordance with another aspect of the invention, a basement wall water protection system includes a plurality of semi-flexible water impermeable plate members with each plate member having an upper leg section that is abuttable against an upper portion of a basement wall and a lower leg section extending substantially away from the basement wall a distance sufficient to keep water away as water seeps downward through the ground toward the basement wall at an angle. Each of the impermeable flexible plate members having a first side edge and a second complementary side edge such that a first side edge of one impermeable plate member can be connected with the second side edge of a second impermeable plate member to form a watertight joint.

The joint preferably includes the first and second edges of two adjacent plates in proximity to each other to form a seam. The plates have undercut grooves in proximity to each edge thereof and running parallel thereto. A first connector member has complementary undercut ribs slidably connected to said grooves to interlock the connector member with both impermeable plate members to cover the seam.

In one embodiment, a first connector connects the lower leg section of the plate members and a second separate connector having depending undercut ribs is slidably receivable in the grooves in the respective upper leg sections of the plate members. One of the first and second connectors has a ribless section that is bendable over a radial section of the plate members to cover the seam at the radial section. It is

desirable that at least one water impermeable flexible plate member has its upper leg section being short and being abuttable against an upper portion of basement wall and its lower leg section being long extending substantially away from said basement wall a distance at least as great as the tangent of 15° times the height of the basement wall below the impermeable plate member. The plate members and other connectors are preferably made from polyethylene.

In accordance with another aspect of the invention, a basement wall water protection system includes a plurality of semi-flexible water impermeable plate members with each plate member having an upper leg section that is abuttable against an upper portion of a basement wall and a lower leg section extending substantially away from the basement wall a distance sufficient to keep water away as water seeps downward through the ground toward the basement wall at an angle.

Each plate member has a first side edge and a second complementary side edge such that a first side edge of one plate member can be connected with a second side edge of a second plate member. The upper leg is placed below ground level and free to move against said basement wall and held against the wall solely by ground pressure.

In accordance with another aspect of the invention, a method of protecting a basement wall from water includes the steps of digging ground to form a trench against the basement wall with the trench being wide enough to receive the plate members; placing overlapping water impermeable semi-flexible plate members in the trench with a short leg of the member abutting against the basement wall and having a long leg extending substantially away from the basement wall; and backfilling the trench with soil above the water impermeable plate members.

The method preferably includes the step of shaping the bottom of the trench to decline at a 5° slope away from the basement wall and extending horizontally in a direction parallel to the basement wall. It is also desirable to interlock adjacent members to each other at the edges of each member.

It is also preferable to plant plants in the backfilled soil above the water impermeable members to use the water retained above the water

impermeable members.

In this fashion a relatively inexpensive method to repair and water leaks and keeping basement walls dry from rain and run off water as it seeps into the ground is provided which can be easily installed in either new construction or retrofitted to existing basement walls.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference now is made to the accompanying drawings in which:

Figure 1 is a segmented elevational view of a basement wall protection system including a plate member installed against a basement wall;

Figure 2 is a plan and schematic view showing three basement walls with plate members installed about the outer sides of the basement walls and corners;

Figure 3 is an enlarged perspective view of several plates assembled together as shown in figure 2;

Figure 4 is a side elevational view of one plate member taken along line 4 shown in figure 3;

Figure 5 is an enlarged end view taken along lines 5-5 shown in figure 3 illustrating the joints between adjacent plate members;

Figure 6 is a view similar to figure 1 illustrating the digging of the trench and placement of the plate members in the trench;

Figure 7 is a front end view taken along lines 7-7 shown in figure 6;

Figure 8 is a view similar to figure 5 illustrating a modified joint for the basement wall protection system;

Figure 9 is a view similar to figure 8 illustrating a further modified joint for the basement wall protection system;

Figure 10 is a view similar to figure 9 illustrating yet another joint for the basement wall protection system;

Figure 11 is a perspective view of another joint for the basement wall protection system;

Figure 12 is a exploded view of the joint shown in Figure 11; and

Figure 13 is a side elevational and exploded view of the joint shown in Figure 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to figure 1, a building 10 with a conventional basement wall 12 and floor 14 is usually submerged in the ground 13 below ground level 15 approximately 6 feet. A conventional drainpipe 16 surrounded by gravel 18 is positioned below the bottom 19 of basement floor 14 about the walls 12 to direct water away from the basement wall 12. Often, the layer of gravel 18 extends vertically upward along wall 12 as shown in figure 1. The exterior 20 of the basement wall 12 may have a conventional water proofing layer 22 such as tar or other hydrophobic layer. This layer 22 in an aged building 10 may have degraded and have a hole or crack which may let water there through and through the basement wall 12.

A plate member 24 is positioned about 16 inches below ground lever l5 and abuts against the wall 12. The plate 24 has a short leg section 26 of about 12 inches in height that abuts against the wall 12 and a long shelf section 28 or also called a long leg section. The long shelf section 28 is about approximately 32 inches long and has a 5° tilt from the horizontal extending away from the short leg section 26 and wall 12. The radius section 29 between the short leg section 26 and long shelf section 28 is about 4 inches in radius. The plate member 24 is about 16 inches in width. The plate member is made from commercially available polyethylene. The shape of the plate members allows them to be stacked together for ease of storage and transportation.

As shown in figure 2, a number of the plates 24 are connected together or overlap each other to provide a continuous water shelf 31 directing water away from the basement wall 12 before the water is free to diffuse back down through the ground 13. A corner member 30 triangular in shape overlaps two end plate members 24 at the corner 32 of two walls 12.

The length of shelf 31 is sufficient to keep the water away from the basement wall section 34 below the plate member 24. It is recognized that free water diffuses through the ground 13 at an angle. For example, sand allows the water to angle as it drains downwardly about a 15° angle.

It has been found that more compacted types of soil or ground provides for more vertical angles. As such, the length of the shelf 31 needs to be a minimum of the height above the bottom floor 19 times the tangent of 15°. When the wall extends 6 feet below ground level 15, and the plate member is placed 16 inches below ground level. That leaves 4 feet 8 inches of wall below the plate member. As such the tangent of 15° times 4 feet 8 inches equals approximately 14.5 inches. For commercial purposes, the shelf section being 32 inches long is sufficiently long for most commercial applications and most deeper basements. As such, normal rainfall entering the soil above the plate member is directed away from wall 22. Once the water clears shelf leg 28, the water angles back at a maximum of 15° and clears wall 12 such that the wall section 34 remains dry.

As shown in figure 3, each plate member 24 is connected to an adjacent plate member 24. The left edge 35 as shown in figure 3 and figure 5 has a J-hook trim piece 36 that can be connected to right edge 37 with a larger encapturing J-trim piece 38 to form a watertight joint 39. The water draining onto the two plate member 24 cannot seep in between the two plate members 24 because the J-trim pieces interlock in a watertight relationship.

The installation of the plate members 24 commences with the digging of a trench 40 about the wall 12 being 16 inches deep and wide enough to receive the plate member 24 as shown in figure 6. The trench should be at least 1 ½ feet wide and preferably in the illustrated case at least 32 inches wide to receive the plate member 24. The bottom 42 of the trench 40 should have a 5° slant away from wall 12 to complement the shape of the plate member 24. The plate members 24 are placed in the trench as shown in figures 6 and 7. Sequential plate members 24 are placed in the trench with the right and left edges 35, 37 with the complementary J-trim being snap fitted together.

Soil 44 removed to form the trench 40 is then placed back in the trench 40 to fill it up. Flowers and other plants 44 may be planted in the soil above the plate members 24 as shown in figure 1. The plate member leg section 26 is not attached to the wall other than by pressure due to the soil placed back into the trench. The plate members are also free to move with

the dynamics of the soil during freeze and thaw cycles.

As can be seen from the above description, a relatively easy installation can be accomplished for pre-existing buildings that need a repair that has a water problem in the basement. The plates are made from a polyethylene plastic that is crack resistant and keeps its suppleness even during cold winter months in temperate climates. The plate can be joined together against water penetration therebetween. The basement walls are provided with a system that reduces humidity and mold growth and thus reduces the degradation of interior painted walls as a result of these undesirable elements. It is further noted that the system deters underground root growth adjacent the basement wall because of the created dry zone. The hydrophobic layer of tar or similar material, therefore, lasts longer due to the reduced root growth. Furthermore, a nice exterior garden may be promoted about the walls 12 due to the captured water that is retained above the plate members 12 before the water is directed away from the basement wall.

A durable system is maintained because the plates work with soil pressure to keep it abutting against the basement wall and even with soil movement, it still maintains its joint 39 with adjacent plate members. The polyethylene plastic retains its flexibility and suppleness to prevent cracking even undergoing subterranean motion.

By only digging 16 inches down below ground level, a home owner can install this system by oneself without the expense of digging 8 feet down to the drain pipe or hiring professionals.

While one joint 39 has been shown and described, other joints are possible and foreseen as illustrated in figures 8-10. Figure 8 shows modified plate member 124 with a joint 139 formed by straight left edge 135 having a forked right edge 137 encapturing the left edge. A seal gasket 141 may be interporous therebetween to prevent leakage. Figure 9 discloses modified plate member 224 with a modified joint 239 formed by a left edge 235 having an enlarged bead 236 that engages a right edge 237 with a forked pincer 238 that may cover the enlarged bead. Figure 10 discloses a plate member 324 with modified joint 339 formed by a left edge 335 and right edge 337 that lays over the left edge 335. The left edge has

a raised rib 336 that prevents leakage into the joint.

Referring now to Figures 11-13, plate members 424 with a joint 439 formed therebetween by left edge 435 of the one plate member 424 that overlies the right edge 435 of another plate member to form a seam 431. Each plate member 424 has an undercut tapered groove 441 in its upper surface in proximity and parallel to each edge 435 and 437. A joint connector strip 443 has two depending undercut ribs 445 that can slide into and interlock with the grooves 441 in the abutting plates 424.

As more clearly shown in Figure 13, joint connector strip 443 overlies only the lower longer leg section 428. A second joint connector strip 447 has similar ribs 449 that slide in groove 441 at the upper shorter leg section 426. The ribs 445 thus do not need to flex but remain relatively straight as it follows the straight leg sections 426 and 428. The seam 431 at the radius section 429 of the plate 424 is covered by a ribless section 451 of strip 447. Both connectors 443 and 447 are also made from polyethylene to be flexible. The ribless section 451 is essentially flat and thus can easily flex to conform to radius section 429 as strip 447 slides into place. The ribless section 451 makes it feasible to easily slide the connector 443 and 447 into the lower and upper longer sections 426 and 428 and also cover the entire seam 431 from the lower by section, up through the radius section 429, and up through the upper shorter leg section 426. The undercut ribs 441 and ribs 445 interlock the two plate members together against independent lateral as well as vertical motion to retain a waterproof joint with structural integrity.

It may be desirable to add a thin impermeable liner of polyethylene against the wall 12 overlapping with the leg section 26 and extending up to the ground level 51. This extra liner may be needed to meet certain local codes that require liners to extend up to the ground level.

Other variations and modifications are possible without departing from the scope and spirit of the present invention as defined by the appended claims.